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EXAMINER

CREPEAU, JONATHAN

| ART UNIT | PAPER NUMBER |
|----------|--------------|
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1746

DATE MAILED: 05/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/774,827

Applicant(s)

KILB ET AL.

Examiner

Jonathan S. Crepeau

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 January 2004.
2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-12 is/are pending in the application.
4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5) ☒ Claim(s) 10 is/are allowed.
6) ☒ Claim(s) 1, 3-9, 11 and 12 is/are rejected.
7) ☐ Claim(s) _____ is/are objected to.
8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

1. This Office action addresses claims 1 and 3-12. Claim 10 remains allowed. Claims 1, 3-9, 11, and 12, although they have been amended, remain rejected under 35 USC §103 for substantially the reasons of record. Additionally, claims 1, 4-9, 11, and 12 are newly rejected under 35 USC §112, first paragraph, as necessitated by amendment. Accordingly, this action is made final.

It is noted that claim 3 has been amended by the use of single brackets. Pursuant to the new amendment practice under 37 CFR§1.121, such single brackets are not proper markings. Applicant is required to re-submit a copy of claim 3, either in clean version or with strikethrough markings, as required by the new rules.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1, 4-9, 11, and 12 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the

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claimed invention. Claim 1 has been amended to recite that the region which is free of active material extends over "greater than 5%" to about 15% of the total thickness of the positive electrode. It is the Examiner's position that the term "greater than" does not have sufficient support in the application as originally filed. The closest support for this is in the original claim language, "about 5%," however, the amendatory language is of a different scope than the original language. For example, the amendatory language excludes values below 5.0, whereas the original language encompasses such values. As such, the amendatory language is considered to constitute new matter.

Claim Rejections - 35 USC § 103

4. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 658949 in view of JP 2000-208144.

Regarding claims 1 and 3, EP 658949 teaches a gastight nickel-metal hydride button cell storage battery in the abstract. The battery comprises positive and negative electrodes (4, 6) separated by a separator. The positive electrode and negative electrode both have support and conductor framework in the form of a porous metal foam or felt (see page 4, sixth paragraph of translation).

The reference does not expressly teach that the positive electrode has a region adjacent the cell case which is free of active material, as recited in claims 1 and 3.

JP '144 is directed to a nickel-metal hydride storage battery (see paragraph 3 of the machine translation). The positive electrode comprises a substrate comprising a metal foam (see

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abstract). The substrate comprises active material (3) in one region (5) and is free of active material in a second region (6) (see abstract; Figure 1).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated to use the electrode of JP '144 as the positive electrode of the EP reference. In the abstract, JP '144 teaches that "[t]hereby, a double-layered structure is formed with the layer A 5 for collecting electricity and the layer B 6 for carrying the electricity with a smaller internal electrical resistance loss so that a charge collecting effect is great and charging and discharging of the large current is possible." Thus, the artisan would be motivated to use the electrode of JP '144 as the positive electrode the EP reference. Furthermore, the artisan would be motivated to leave between 5 and 15% (e.g., about 10%) of the electrode thickness free of active material, as recited in claims 1 and 3. In paragraph 30, the reference teaches that "[c]onsequently, if a non-filling layer becomes large and the internal electric resistance loss of an electrode substrate becomes small, in voltage (V) and capacity (mAh), the electric discharge property of a high current rose, and the effect of a fall of internal electric resistance has shown up. By changing the thickness of a metal porous body according to the discharge current from these, the electrode substrate according to the required amount of current can be obtained." Thus, the thickness of the region that is free of active material is recognized by the Japanese reference as being a result-effective variable. It has been held that the discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. *In re Boesch*, 205 USPQ 215 (CCPA 1980). Accordingly, the claimed thickness ranges are not considered to distinguish over the references.

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5. Claims 1 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 658949 in view of Matsumura et al (U.S. Patent 5,981,108).

Regarding claims 1 and 3, EP 658949 teaches a gastight nickel-metal hydride button cell storage battery in the abstract. The battery comprises positive and negative electrodes (4, 6) separated by a separator. The positive electrode and negative electrode both have support and conductor framework in the form of a porous metal foam or felt (see page 4, sixth paragraph of translation).

The reference does not expressly teach that the positive electrode has a region adjacent the cell case which is free of active material, as recited in claims 1 and 3.

Matsumura et al. is directed to a nickel-metal hydride storage battery comprising a nickel positive electrode (see col. 6, lines 15-17). The electrode comprises a substrate comprising foamed nickel or a nonwoven fabric of nickel fibers (see col. 2, lines 23-25). The substrate has a first principal face and a second principal face, and the active material is filled into the substrate by supplying it from the first principal face side (see col. 2, lines 13-15). After compression, the active material occupies about 95%-99% of the entire thickness of the substrate (see col. 3, lines 1-5). The remaining percentage (1-5%) of the substrate that is free of active material functions as a current collector (see col. 3, line 7 et seq.).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Matsumura et al. to manufacture the positive electrode the EP reference by filling it from one side, resulting in an electrode having a region adjacent the can that is free of active material. In column 1, line 60, Matsumura et al. teach that "the spraying method is

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unsatisfactory from the point of uniform filling of a preadjusted amount of a paste into the spaces of a porous metal substrate and is to be improved in various points in the future. From the practical point of view, further control of the variations (dispersion) in the filled amount of paste and battery capacity is strongly desired. [...] The primary object of the present invention is to provide an electrode for a battery comprising a sheet or a plate-like porous metal substrate having three-dimensional communicating spaces, particularly a nickel electrode with minimal variations in the filled amount of an active material, and to provide a battery of large capacity with less variations in the discharge capacity." Thus, the artisan would be motivated by the disclosure of Matsumura et al. to manufacture the positive electrode the EP reference by filling it from one side, resulting in an electrode having a region adjacent the can that is free of active material. Additionally, as noted above, Matsumura et al. teach that about 1-5% of the electrode thickness is left free of active material, thereby rendering the range recited in claim 1 obvious. More particularly, the lower endpoint of claim 1 ("greater than 5%") and the reference's upper endpoint ("about 5%") overlap since each encompasses values just above 5.0. Furthermore, the artisan would be motivated to increase this thickness to about 10%, as recited in claim 3, to increase the current collecting capability and reduce the internal resistance of the electrode. Accordingly, the subject matter of claim 3 would also be rendered obvious.

6. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 658949 in view of Matsumura et al. as applied to claims 1 and 3 above, and further in view of JP 61-216269.

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The EP reference does not expressly teach that both the positive and negative electrodes have a central cut-out.

JP 61-216269 is directed to an enclosed button type battery comprising central cut-outs in the positive and negative electrodes (see abstract; Figure 1).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of JP 61-216269 to use such a cut-out in the positive and negative electrodes of the EP reference. In the abstract, the Japanese reference teaches that a constant internal pressure is maintained and that the battery is tolerant to overcharging. Accordingly, the artisan would be motivated to use cut-out portions in the positive and negative electrodes of the EP reference. Additionally, the artisan would be motivated to use a cut-out having a volume of between 5 and 20% (e.g., about 10%) of each electrode volume as recited in claims 4-6. The size of the cut-out is proportional to amount of active material in the cell, which directly affects the capacity of the cell. Therefore, an artisan would want to remove only a small amount so as to not adversely impact the cell capacity. Accordingly, the claimed ranges are not considered to distinguish over the references.

7. Claims 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 658949 in view of Matsumura et al. as applied to claims 1 and 3 above, and further in view of Hara et al (U.S. Patent 4,587,180).

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The EP reference does not expressly teach that the negative electrode has a recess on the side facing the cell cover.

Hara et al. is directed to an enclosed button type battery comprising a recess in the surface of the negative electrode (6, 26) facing the cell cover (see Figures 1 and 3).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would be motivated by the disclosure of Hara et al. to use such a recess in the negative electrode of the EP reference. In column 1, line 44, Hara et al. teach that their invention is concerned with "preventing the welding of a connecting tab from exerting a thermal effect upon the negative electrode of the cell." Accordingly, the artisan would be motivated to use a recess in the negative electrode of the EP reference. Additionally, the artisan would be motivated use a recess having a thickness of between 5 and 15% (e.g., about 10%) of the negative electrode, as recited in claims 8 and 9. The size of the recess is proportional to amount of negative active material in the cell, which as noted above, is a parameter that directly affects the capacity of the cell. Therefore, an artisan would want to remove only a small amount so as to not adversely impact the cell capacity. Accordingly, the claimed ranges are not considered to distinguish over the references.

8. Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over EP 658949 in view of Matsumura et al. applied to claims 1 and 3 above, and further in view of Kohler et al (U.S. Patent 5,800,947) and Sugalski (U.S. Patent 4,529,675).

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The EP reference does not expressly teach that a substantially flat spring having a plurality of flat spring elements bent out of a base material on one side thereof and a plurality of ribs extending outwardly on the other side thereof is located between the negative electrode and the cell cover.

Kohler et al. is directed to an enclosed button type battery comprising a spring element (6) located between the negative electrode (5) and the cell cover (4) (see Figure 1).

Sugalski is directed to cylindrical battery comprising a substantially flat current collector (32) having a plurality of flat spring elements (34) bent out of a base material on one side thereof and a plurality of ribs (33) extending outwardly on the other side thereof (see Figs. 2 and 3).

Therefore, the invention as a whole would have been obvious to one of ordinary skill in the art at the time the invention was made because the artisan would first be motivated by the disclosure of Kohler et al. to use a spring member between the negative electrode and cell cover of the EP reference. In column 1, line 15, Kohler et al. teach that such a spring produces an "intimate contact" between the electrodes and cell casing. Accordingly, the artisan would be motivated spring member between the negative electrode and cell cover of the EP reference.

Further, the artisan would be motivated to use the spring structure disclosed by Sugalski as the spring member in the modified battery of the EP reference. In column 2, line 43, Sugalski teaches that this configuration "reliably and invariably establish[es] a sufficient electrical path between the cell electrode and the external terminal of the cell even under conditions associated with high rate manufacturing assembly production lines and under conditions wherein the cell may be subjected to severe impact or vibration." Accordingly, the artisan would be motivated to

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use the flat-spring/rib structure of Sugalski at a location between the negative electrode and cell cover of the battery of the EP reference.

Response to Arguments

9. Applicant's arguments filed January 20, 2004 have been fully considered but they are not persuasive. Applicants assert that "the '144 Publication nowhere discloses, teaches or suggests that the active (5) and non-active (6) regions of the electrode 1 should be in any particular proportions, let alone the specific proportions recited in claims 1 and 3." However, it is submitted that the reference, in several places, provides guidance as to the thickness of the non-active layer. Table 2 in particular is noted, where substrates of varying thicknesses are each filled to a depth of 1.4 mm and then compressed to a total thickness of 0.7 mm. Further, as noted above, paragraph 30 teaches that if the non-filled layer becomes large, internal resistance is decreased. Since this disclosure identifies the thickness as a result-effective variable, the artisan would be sufficiently skilled to optimize such thickness. As such, the claimed ranges of thickness are still not considered to distinguish over the '144 publication.

Applicants further assert that "there is no teaching, suggestion or motivation in either the EP Patent or the '108 Patent to select an electrode with a non-active portion over 5% of the total electrode thickness, as now recited in claim 1." First, as noted in the rejection above, the claimed range (greater than 5%) and the range of the '108 patent (about 5%) are believed to overlap since each encompasses values just above 5.0. Thus, Applicant's range is still rendered

prima facie obvious by the reference. Furthermore, it is believed that sufficient motivation does exist for increasing the active-material free region to about 10%, as recited in claim 3. As noted in the discussion of the JP '144 publication above, the thickness of the non-active portion may be manipulated to affect parameters such as internal resistance. As such, it is believed that sufficient motivation exists for increasing the thickness of the non-active portion of the '108 patent, thereby rendering applicant's claimed range of "about 10%" obvious.

Allowable Subject Matter

10. Claim 10 is allowed.

11. The following is a statement of reasons for the indication of allowable subject matter:

The reasons for allowance of claim 10 were given in the Office action of September 18, 2002 and remain applicable herein.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after

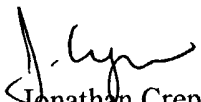
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the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonathan Crepeau whose telephone number is (571) 272-1299. The examiner can normally be reached Monday-Friday from 9:30 AM - 6:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski, can be reached at (571) 272-1302. The phone number for the organization where this application or proceeding is assigned is (571) 272-1700. Documents may be faxed to the central fax server at (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Jonathan Crepeau
Patent Examiner
Art Unit 1746
May 11, 2004